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October 10, 1959

VOL. 76 NO. 15

PAGES 225-349

SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE



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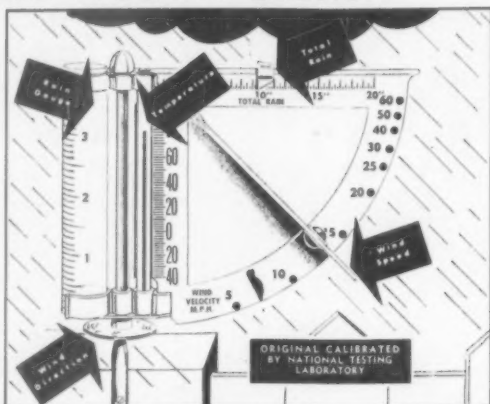
A Long View

See Page 229

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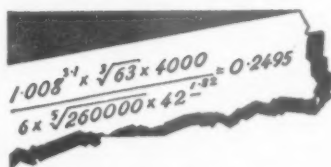
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THE COVERAGE is to about February-March, 1959. Thanks to the courtesy of authors in supplying advance copies of papers in press, some still more recent literature is reviewed.

THE COOPERATION of a number of steroid chemists in reviewing copies of the manuscript has contributed greatly to correction and improvement of the book in advance of publication.

CHAPTER TITLES

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| 3 Structures of the Bile Acids and of Cholesterol | 13 Biosynthesis of Cholesterol |
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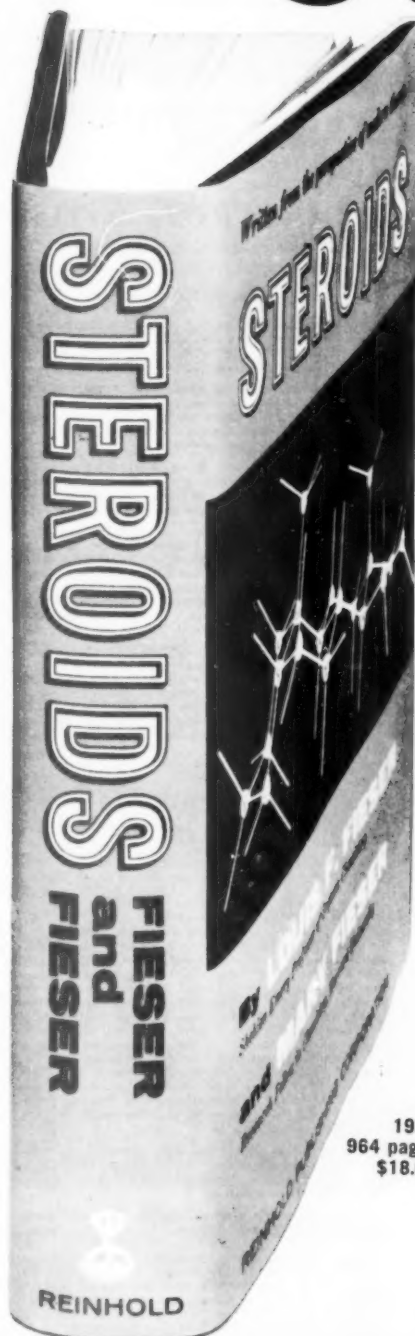
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REINHOLD

AGRICULTURE

Farming Becomes Business

COMMERCIAL farming in 1975 will be essentially a business proposition rather than a way of life.

Although there will be one-third fewer farms by that time, the remaining farms will be larger, more productive and more specialized and serve a one-third larger United States population.

These predictions were made by Merton S. Parsons, agricultural economist with the U. S. Department of Agriculture, at a Society of Automotive Engineers meeting in Milwaukee, Wis.

Farming of the future, Mr. Parsons said, will be affected largely by the same forces that have acted in the past. Most of the trends already underway in farming, he said, are likely to continue for the next 15 to 20 years.

Among these trends are the decline in number of farms and farm population; the growth of the size, output, specialization and commercialization of the average farm, and increased mechanization.

By 1975, he said, the number of commercial farms, the group that produces nearly all our farm products for sale, will

be about 2,000,000 as compared with 3,000,000 now. The estimated 1958 U. S. population was 174,000,000.

The increase in production per farm, however, will be attained partly by more acres per farm, but primarily by wider use of improved technology and mechanical methods to increase production per acre, per animal and per farm worker.

Output per man-hour could more than double by 1975, Mr. Parsons said, if the trend of the last decade continues. This could result in a large increase in farm production with a farm labor force even smaller than at present. In fact, the number of farm workers for 1975 is projected at about 2,000,000 less than the current number of about 7,500,000.

The larger, more complex farms of the future will require investments in real estate, livestock and machinery about double the present level. The high capital requirements will create new problems in financing and in transferring farms from one generation to the next, and farming will become less of a "way of life."

Science News Letter, October 10, 1959

PUBLIC HEALTH

Protect U.S. From Malaria

THE WORLD Health Organization has its finger in the malaria dike in Central and South America.

Malaria has been eradicated in the United States, but there are 5,000,000 square miles in Central and South America that still harbor the Anopheles mosquito, the carrier of malaria.

There is now a widespread campaign to rid this hemisphere of the mosquito. A report of the progress of the campaign was presented to the directing council of the Pan American Health Organization, a member of WHO, meeting in Washington.

The report shows that by July, 1958, only Chile, the U. S., Barbados, Martinique and Puerto Rico had successfully stamped out malaria. At that time it was discovered that the mosquitoes in El Salvador were resistant to the two insecticides used, dieldrin and DDT.

Latest reports reveal resistance to the insecticides has also developed in British Honduras, Colombia, Cuba, Ecuador, Guatemala, Honduras, Mexico, Nicaragua, Jamaica and Trinidad.

Eradication programs are in full swing in Mexico, Colombia, Peru, Bolivia, Panama and her immediate neighbors. The south-eastern half of Brazil is under an approved plan of operations but eradication has not begun. The northwestern half is also undergoing an eradication program, the report shows.

In those areas where mosquitoes build a resistance to DDT, World Health Organization workers switch to dieldrin, and switch to DDT in those areas where the Anopheles

has evaded dieldrin. In El Salvador, where just such resistance has occurred, WHO workers have introduced malathion, which appears to be doing the job, said Dr. Louis Williams, consultant for the Pan American Health Organization.

Sometimes citizens themselves unknowingly interrupted the insecticide cycle, thus prolonging the life of the mosquitoes. For instance, during an inspection trip the officers of the campaign in a South American country stopped overnight in a town in the interior that had been sprayed one month previously.

During the courtesy visit to the mayor he informed them that, to commemorate World Health Day, he had decided that all the citizens would paint the inside walls of their houses—the same walls that had been sprayed.

Science News Letter, October 10, 1959

MINING

Iron Supplies Seen Ample For Immediate Future

WORLD SUPPLIES of iron ore are "more than ample" for the immediate future but in the long run major new sources will have to be developed.

United States iron ore imports rose from about 2,800,000 tons, or four percent of the ore consumed in the country, in 1946 to nearly 28,000,000 tons, or about 27%, in 1958. They may be expected to reach a figure of 60,000,000 tons annually by 1965.

Most of this increased tonnage, R. W.

Whitney of the Hanna Mining Co., Cleveland, Ohio, told the Metal Mining and Industrial Minerals Convention of the American Mining Congress in Denver, Colo., will come from sources now being operated or under active development.

For example, Canada, which currently can export up to 20,000,000 tons of ore annually to the U. S. and Europe, should be capable of exporting 34,000,000 tons a year by 1965, he pointed out.

As we spend greater sums to develop high-grade ores in out-of-the-way places, Mr. Whitney said, we should also spend more money for ore preparations facilities nearer home.

Science News Letter, October 10, 1959

SCIENCE NEWS LETTER

VOL. 76 OCTOBER 10, 1959 NO. 15

Edited by WATSON DAVIS

The Weekly Summary of Current Science, published every Saturday by SCIENCE SERVICE, Inc., 1719 N. St., N.W., Washington 6, D. C., NORTH 7-2255. Cable Address: SCIENSERV.

Subscription rates: 1 yr., \$5.50; 2 yrs., \$10.00; 3 yrs., \$14.50; ten or more copies in one package to one address, 7½ cents per copy per week; single copy, 15 cents, more than six months old, 25 cents. No charge for foreign postage.

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Printed in U.S.A. Second class postage paid at Washington, D. C. Established in mimeograph form March 13, 1922. Title registered as trademark, U. S. and Canadian Patent Offices. Indexed in Reader's Guide to Periodical Literature, Abridged Guide, and the Engineering Index. Member Audit Bureau of Circulation.



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ROCKETS AND MISSILES

Chart Space "Weather"

Information radioed back from Explorer VI is providing scientists with their first charts of the "winds" and "weather" of outer space.

See Front Cover

THE "WEATHER" of space is now being charted for the first time by scientists using information radioed back to earth from satellites.

Before rocket probes and satellites were sent spinning into space around earth, many scientists thought that changes in the earth's outer atmosphere, if any, occurred slowly.

Now they are finding that there are "winds" and streams of nuclear particles in nearby space, undergoing sudden and violent changes. Gradually the meteorology of space in earth's vicinity is being charted, but one difficulty is that different pictures are obtained depending on what instruments are used to view the radiation.

Latest findings from Explorer VI, the paddlewheel satellite launched Aug. 7, indicate that the radiation belts near earth are not as sharply divided as once thought. They are now thought more likely to be one large radiation area, with varying zones of intensity for the different kinds of radiation.

Most of the radiation, which could prove hazardous to manned space travel, can be eliminated by shielding with relatively thin layers of such materials as aluminum and lead.

At a National Aeronautics and Space Administration news conference, Dr. John A. Simpson of the University of Chicago reported that information from Explorer VI showed the presence of a thin band of highly energetic protons some 300 miles thick at the lower edge of earth's radiation zone. Manned space vehicles would probably travel through this region at such high speeds, however, that it would not constitute a barrier to interplanetary explorations.

Scientists from the Space Technology Laboratories of Inglewood, Calif., reported instruments on Explorer VI had transmitted the first crude image of the earth's cloud cover. The television-like picture covers a broad area of the central Pacific, and indicates in very rough fashion earth's clear and cloud-covered areas. At the time the photograph was transmitted, which took some 40 minutes on Aug. 14, the satellite was about 17,000 miles above the earth's surface, crossing Mexico. The area photographed was thus more than 20,000 miles from the satellite.

The photograph on the cover of this week's SCIENCE NEWS LETTER shows a sunlit area of the Central Pacific ocean and its cloud cover, in the section at the right. The lined areas in the section at the

left represent a cloud-cover map, prepared from meteorology charts, which have been superimposed on a globe to show the lighted area which the Explorer VI television scanner saw.

Science News Letter, October 10, 1959

AERONAUTICS

NASA Asks Radio Hams Not to Endanger Tests

U. S. RADIO AMATEURS were urged "not to experiment" with radio signals that, when broadcast, might trigger a rocket misfire or satellite payload-ejection equipment.

A "spurious signal" has been cited as cause for the unsuccessful testing of a developmental capsule at Wallops Island, Va. NASA said the spurious signal which spoiled the launching definitely came from its own launch equipment in this case, but that a radio ham might accidentally start the launching. Even though NASA believes the chance of this happening is remote, further to safeguard its experiments NASA releases no information on the radio frequencies used, the type of coding or the time of launching.

Science News Letter, October 10, 1959

RADIO

New Short-Wave Radio Has Dual Transmission

A SHORT-WAVE radio transmitter has been developed that can simultaneously broadcast two or more independent transmissions on different wavelengths.

The one-kilowatt Marconi Wireless Telegraph Company's transmitter, Chelmsford, England, may be particularly useful in ground-to-air communications because it enables service on one frequency to be put on a second frequency before being discontinued on the first frequency, the Company said. (Changes in short-wave frequencies often are made as radio conditions fluctuate.)

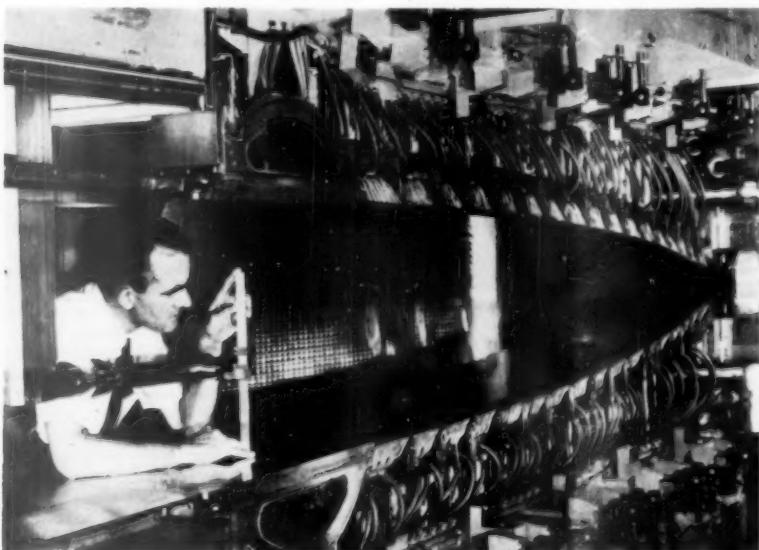
The secret of the transmitter is a device known as a distributed amplifier. Unlike conventional types, this amplifier dispenses with tuning controls. The design is such that even if a tube fails, the transmitter is unlikely to go "off the air." Instead there would be only a slight reduction in output.

The unit overcomes what has always been a major drawback with conventional transmitters: the complex stage-by-stage retuning of the high-frequency amplifier whenever it is desired to change frequency. The distributed amplifier provides wide-band amplification over the whole high-frequency band, thereby obviating operational tuning in the transmitter's high-frequency amplifier stages. At the same time it permits the simultaneous radiation of two or more independent transmissions.

Although the distributed amplifier is used as a low-level voltage amplifying device, for instance, in oscilloscopes, this is believed to be its first successful use for this service.

The engineers mainly credited for the development are B. M. Sosin and V. O. Stokes.

Science News Letter, October 10, 1959



HYPERSONIC WIND TUNNEL—An upstream view of the nozzle of the California Institute of Technology Jet Propulsion Laboratory's new \$3,500,000 hypersonic wind tunnel shows Roger Barnett positioning a model missile in the 21-by-21-inch test section. The two tapering stainless steel plates, which can be seen at the top and bottom of the nozzle, are flexible and can be contoured to test forms by a system of 16 hydraulic jacks.

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SURGERY

Stopped Heart Beats

A DOG'S heart can be preserved for 20 hours, transplanted and stimulated to beat again.

A report on the method of prolonging the preservation of organs was presented to the American College of Surgeons meeting in Atlantic City, N. J., by Drs. Ernest M. Barsamian and Samuel C. Collins, Massachusetts Institute of Technology, Dr. Stanley W. Jacobs, University of Oregon, and Dr. Owen E. Owen, St. James Hospital, London.

Here is what the scientists did:

The hearts of puppies aged one to four weeks were transplanted into the necks of adult mongrel dogs. Two of the hearts were transplanted immediately after removal. Within minutes, a good coronary flow was established and both hearts in each dog regained a normal beat which continued for 60 hours, the scientists reported.

However, other puppy hearts were dehydrated up to 55% rehydrated, and resuscitated after transplantation into the necks of dogs.

Five hearts that were refrigerated for less than 24 hours were also successfully resuscitated when transplanted into dogs.

It is clear from these experiments that by lowering the temperature of the preserved heart from 37 degrees centigrade to four degrees, the heart can safely survive without a blood supply for almost one day, the investigators said. The rate of dehydration appears to have some effect upon this endurance, they add.

This work has no clinical application, they stressed. It represents a fundamental study in the possibility of preserving hearts at low temperature.

This type of transplant cannot be done on man until the problem of homograft rejection is solved. Homograft rejection occurs when tissue or an organ is transplanted to the host body. The host soon sloughs off the transplant, treating it as a foreign body.

Two enterprising surgeons have capitalized on communism and Russian experiments.

These two University of Pittsburgh doctors have taken advantage of the recent Russian surgeons' work that involved transplanting a dog's head onto another dog. Actually, this work was done in the first decade of the 1900's, Drs. Samuel P. Harbison and Barnard Fisher said. Furthermore, it was done by an American, Dr. C. C. Guthrie, at the University of Pittsburgh, the surgeons told their colleagues attending the meeting. They exhibited a new edition of Dr. Guthrie's book on "Blood Vessel Surgery and Its Applications," originally printed in 1912.

"While the Russians claim a first, Dr. Guthrie accomplished these transplants 51 years ago," Dr. Harbison pointed out.

Dr. Guthrie's first head transplant was done on a white terrier. The picture of that two-headed dog was displayed. Also displayed was a blown-up picture of another head transplant that appeared in the *Journal of the American Medical Association* (Nov. 14, 1908). The picture in the *Journal* was

taken one and one-half hours after the operation. The two-headed dog lived 12 hours, at which time it was killed.

At that time, Dr. Guthrie's work with blood vessel surgery, involving the transplanted head, was a feat. This is no longer true, however, Dr. Harbison said, despite the publicity given to the Russians.

The head transplant is today considered to be a surgical oddity. Surgeons today still face a tremendous problem with transplants. The host body will not accept a transplant but, rather, will reject it unless it is an organ or tissue from an identical twin, he said. Presently, blood vessels are being replaced not by transplants, but by synthetic materials such as nylon. Even this is not "accepted" by the host, but is tolerated long enough for tissue to gradually grow around the fabric, reconstructing a new vessel.

Science News Letter, October 10, 1959

SURGERY

Female Sex Hormones May Cause Gallstones

GALLSTONES that develop in mothers appear to be due to the abundant production of female hormones during pregnancy.

It is well-recognized that women who have borne several children are very likely to develop gallstones. These stones occur only when biliary physiology is disturbed. Drs. Kamil Imamoglu, Stephen L. Wangenstein, Harlan D. Root, Peter A. Salmon, Ward O. Griffen, Jr., and Owen H. Wangenstein, all of the department of surgery, University of Minnesota Medical School, Minneapolis, reported.

An experiment with rabbits led the investigators to conclude that prolonged administration of two female hormones, progesterone and stilbestrol, could produce such gallstones. They suggested to their colleagues attending the American College of Surgeons meeting, Atlantic City, N. J., that pregnancy increases the production of female hormones. This in turn may be the cause of the formation of gallstones, they said.

During the rabbit experiment, both male and female animals received progesterone and estrogen, hormones that are normally in abundance during pregnancy.

Results of the test showed that eight of ten female and five of ten male rabbits developed stones in the gall bladder. The animals were examined either upon death or within from 20 to 51 weeks.

The gall bladder was enlarged two to three times its usual size in most of the animals, including those that failed to develop stones, the surgeons pointed out. Control animals did not exhibit any changes in their biliary tract.

In addition, 50 young pregnant women, between the ages of 16 and 35, were observed shortly after delivery. After 24 hours, 28 of these patients exhibited evidence that there was a delay in emptying the gall bladder.

Science News Letter, October 10, 1959

EDUCATION

Science Youth Program Grows

When need for future scientists was unappreciated before Pearl Harbor, there were beginnings of National Science Youth Program which now has become world-wide.

LONG BEFORE our fear of sputniks and Russian education created a renaissance in science interest, a nationwide program supplementing American science education had begun.

Even before the time of Pearl Harbor, the basic structure of the National Science Youth program, which has been developed and operated at the national level by Science Service, was planned. Before World War II there was little national appreciation of the fact that large numbers of scientists of high creative ability, and engineers of great technical skill would be needed in the future. As a matter of fact, only a few years earlier a government agency had predicted that there would be an oversupply of scientific and technical personnel, a forecast which was regretted by those responsible for having ventured it.

Science Service, the institution for the popularization of science, had been engaged in reporting and interpreting advances in the world of science and technology since 1921. Out of this experience there came the conviction that there would be greater, not less, demand for well-equipped scientists of all descriptions. The war in Europe was a menacing sign that science would be used for purposes of destruction and that even greater research and knowledge was necessary in order to protect us from the forces of aggression.

The world was in virtual ignorance, despite the warning of some alert scientists and writers, of the release of atomic energy and the implicit possibilities of the atomic bomb. Not even security had been thrown about such knowledge of the fission of uranium and its possibilities.

Efforts for the Future

At this point in America's prewar state, Science Service was determined that there should be a widespread effort at finding the potential creative scientists of the future and a concerted attempt at inspiring them so that as many of them as possible would be encouraged to go on to college and to equip themselves to become the scientists of the future.

There were some efforts to give youth scientific opportunities. As always, bright boys and girls with perpetual questions in their eager minds had undertaken their own youth-for-research projects. Rising partly out of exhibits shown by the American Institute of the City of New York at the New York World's Fair, there were some science clubs and a number of science fairs in leading cities, patterned from the first held in New York City.

When, in 1941, Science Service learned that this effort might have to be abandoned,

it was determined that the institution that had pioneered in putting science in the newspapers should turn some of its efforts toward science for youth. With the existing group of some 700 science clubs as a basis, Science Clubs of America was instituted.

To teachers of science primarily in the secondary schools the offer was made that if they desired to become sponsors of groups of students interested in extracurricular or classroom activities in science, they would be affiliated with Science Clubs of America without fee and sent the essential materials needed for organization and conduct of a science club or group.

Until the organization of Science Clubs of America a fee had been charged for such affiliation but the furnishing of cooperation without charge proved to be essential and effective in securing the maximum participation on the part of science teachers and others.

Science Clubs Growing

There has been a steady growth in the number of groups affiliated with Science Clubs of America until now the number is 25,000, of which approximately 500 are overseas. Multiple mailings to all the sponsors during the school year bring them such materials as the annual Sponsor Handbook, How to Organize a Science Club, announcement of October National Science Youth Month, and various booklets issued in cooperation with professional organizations, such as the Edison Foundation and the American Dental Association.

The Science Talent Search was created and begun at the beginning of Science Service's sponsorship of National Science Youth activities. Up to that time there has been no effort to identify and give special opportunities to those still in high school who have the potential ability to become creative scientists of the future. Individual universities had undertaken a selection of high school seniors of high ability for scholarship opportunity, but there had been no national program to identify and implement science talent at the high school level.

While the drive for potential scientific personnel useful in the war effort had not yet begun, Science Service with the support of Westinghouse began the Science Talent Search, seeking among the senior high school students of the nation those who have high scientific potential as judged by an aptitude test, educational record, and science accomplishment as shown by recommendations and a report of an experimental project. The mechanism of the Science Talent Search proved so successful that it has remained virtually unchanged for al-

most two decades. Thousands of promising young scientists have been recommended to the colleges and universities of the nation, and in addition to the Westinghouse scholarships awarded have received major support from the institutions of higher education. Some of those identified in the Science Talent Search are now occupying responsible positions in research. Some 95% of those winning honors in the Science Talent Search entered college (honors are now given to about 10% of the entries) contrasted with about 50% of all high school graduates. Experience shows that of the honors and winners group about half of them achieved the Ph.D., or its equivalent, which contrasted with less than 5% of the general run of high school graduates.

It was found in Science Talent Search studies that interest in science develops at an early age. While the identification of science talent during the terminal year at high school was an essential and effective procedure, the inspiration and practice of science in the early years was necessary to developing the interest and ability of young scientists. For that reason the place of the science club in this process was emphasized and encouraged.

Just as professional adult scientists have the goal of scientific publication in journals or through papers read at meetings, there is need for a culmination of the scientific work of the young scientists. Projects, undertaken in much the same manner as researches of more mature scientists, may be in progress throughout the year but they are often begun in the fall with the re-opening of school. The holding of a science fair in the spring, toward the close of the school year, proved to be an effective way in which the science projects of the young scientists could be shown to fellow students, teachers, parents and the public.

Fair: Nucleus for Activity

Science fairs had begun about a decade before Science Service's participation in a science youth program. With the Science Clubs of America organized and the growing participation of science club sponsors, Science Service endeavored to inspire and implement more science fairs, both in individual high schools and upon a local and regional level. Suggestions were issued as to how groups of teachers, school officials, and students themselves could obtain the cooperation of newspapers, industries, colleges and universities, service clubs, museums, and other local and regional organizations in the conduct of science fairs. Committees organized in this way to conduct science fairs became the nuclei of science youth activities in cities and regions. Some of these committees or councils went beyond the mere holding of science fairs and participated in such activities as supporting science teaching itself, strengthening of science curricula in the schools, and the organization of industrial cooperation with

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schools, involving scientist substitutes for teachers upon special occasions, lectures by scientists in the schools, and visits to industries and colleges by students and teachers.

In 1950, science fairs throughout the nation on a local and regional basis had become so numerous that Science Service determined to inaugurate the National Science Fair. National Science Fair serves as a culminating activity of the Science Youth program during a school year. It is an effective experience for the finalists, a maximum of two from each of the approximately 200 regional fairs now affiliated with the National Science Fair. More important, it is an incentive to organizing local and regional fairs through the desire of each area to participate in a national activity.

The hope that any young scientist anywhere in the United States will be able to enter a local or area science fair preliminary to the possible participation in the National Science Fair is rapidly becoming achieved. Among the states that are completely covered with science fairs, so far as the territory from which they draw is concerned, are Indiana, Texas, Montana, Wyoming, Colorado, New Mexico, North Dakota, South Dakota, Arkansas, Louisiana, Mississippi, Alabama, Florida, Georgia, North Carolina, South Carolina, Delaware, Rhode Island.

The National Science Fair became international in 1958 through the entry of finalists from Japan's National Fair. Plans are under way for other countries, and areas in other countries, to enter in future years. It is possible in addition to the National Science Fair there will also be some form of international science fair justified in the coming years.

Science Service's service to newspapers which are widely published throughout the world, serves youth as well as adults in conveying promptly news and interpretation of the fast-moving developments in science and technology. In many cases the newspapers that cooperate in the National Science Youth program, supporting science clubs and science fairs locally, also utilize the news and feature reports of Science Service.

The SCIENCE NEWS LETTER, issued weekly to a growing audience that includes many science teachers as well as the general public, is also an effective medium for conveying science information to youth, both directly through subscription by the young scientists themselves and through their school groups and libraries.

Because experimentation is the essence of science learning, a series of experimental kits, issued monthly under the title THINGS of science, was inaugurated in the early days of Science Service's science youth activities. These have been widely used to introduce experimental science to beginners. Unless the student does experiments himself he cannot understand science effectively. The THINGS units, costing little, can be used individually and expended in the using. Since these kits also present new and novel materials from time to time they have been of great usefulness in informing professional scientists, industrialists and others about new scientific and technical developments.

For a specialized field and especially for high school teachers, Science Service publishes CHEMISTRY magazine eight times a

year. There are other Science Service aids to education and science youth activities, such as books, color slides, etc.

Because nationally as well as locally the opportunities for aiding science youth are large, many national organizations are interested in science for youth. October is designated as National Science Youth Month each year and more than 30 national organizations join with Science Service in this event at the beginning of the new school year.

Added support for Science Service's National Science Youth Program will enable a greater service to be made to young scientists, their teachers, the educational system and the public. Among the organizations that have given grants for youth activities are the National Science Foundation, Westinghouse Educational Foundation, Sloan Foundation, Dupont, and Charles F. Kettering.

Science Service is a nonprofit institution, with trustees nominated by the National Academy of Sciences, the National Research Council, the American Association for the Advancement of Science, the E. W. Scripps Estate, and the journalistic profession, contributions to Science Service are income tax deductible. They will pay great dividends in better scientists and citizens for the future years.

Science News Letter, October 10, 1959

EDUCATION

Eisenhower Urges Science Youth Participation

PRESIDENT Eisenhower has urged participation in National Science Youth Month, being observed this month, "in communities everywhere as a means of strengthening all phases of education, and stimulating in young students a strong regard for the traditions of intellectual excellence."

"National Science Youth Month," the White House statement said, "will be observed throughout October by numbers of Americans alert to the need to help young persons develop their scientific abilities."

"High school students and their science teachers will be joined by 33 national civic, professional, industrial, labor, and educational groups in the observance under the auspices of SCIENCE SERVICE."

"Encouragement of scientific education provides everyone with an opportunity to help develop a vital national asset. It can further give to all Americans an opportunity to share more fully in the adventure and excitement of science and to gain a more intelligent understanding of the increasingly scientific world in which we live."

Science News Letter, October 10, 1959

Do You Know

Food spoilage annually costs Americans more than the total defense program.

Aluminum is one-third lighter than steel.

Some bacterial cultures produce distinct fruity and oniony odors on chilled muscle of cod and haddock during early spoilage.

ENGINEERING

Auto Exhaust Smog May Be Cut by Mixing Device

THE AUTOMOBILE as a smog-producer may be eliminated if the composition of its exhaust is changed.

Richard D. Kopa, a research engineer at the University of California, Los Angeles, has been studying the composition of the auto exhaust gas for several years, trying to eliminate the components responsible for obnoxious smog.

Among hundreds of organic and inorganic compounds found in auto exhaust gas, Mr. Kopa says, only two groups are serious trouble makers: certain unburned hydrocarbons and the oxides of nitrogen.

His main weapon against nitrogen oxides is an inexpensive mixing device mounted on top of the carburetor. Using the device to inject additives into the air stream before combustion, he has been able to eliminate 80% of the nitrogen oxide from auto exhaust in laboratory experiments.

The injection method is not new, but for the first time Mr. Kopa has discovered the underlying reason for its effectiveness. Simply stated, the injected additives lower the peak combustion temperature, thereby lowering production of nitrogen oxides.

Turning to the second exhaust pollutant, the UCLA engineer is testing various compounds to alter the chemical make-up of gasoline, so as to cut down on smog-forming unburned hydrocarbons emitted from engine exhaust.

In a series of road tests during the next few months, Mr. Kopa will measure the smog-reducing ability of the mixing device and of the blended gasoline, and check their effect on engine performance and economy.

Science News Letter, October 10, 1959

ENTOMOLGY

Killing Back Yard Wasps Is a Tricky Business

DESTROYING wasp nests in the back yard is a precise and exacting task, the Department of Agriculture reports.

You should wait until an hour after full darkness, creep up on the nest by flashlight and then thoroughly dust or spray the nest with a solution of DDT or chlordane.

The darkness will not necessarily protect the sprayer but it will insure that all the wasps are home and bedded down for the night.

A comb-like nest may be treated by covering the open cells with a dust containing five percent chlordane or five to ten percent DDT, the USDA says. To kill hornets or yellowjackets in their paper-like globular nests, you must spray a water emulsion of two percent chlordane or five percent DDT into the one opening in the nest.

A few precautionary measures: put your flashlight on the ground because the wasps will come out and follow the beam of light; wear dark clothes, and work fast.

Single copies of "Wasps, How to Control Them" (Leaflet 365) are available free from the Office of Information, U. S. Department of Agriculture, Washington 25, D. C.

Science News Letter, October 10, 1959

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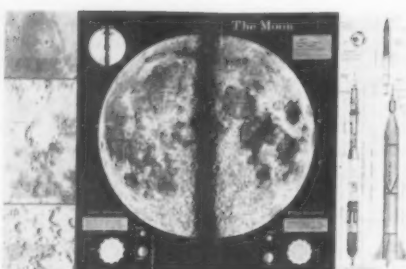
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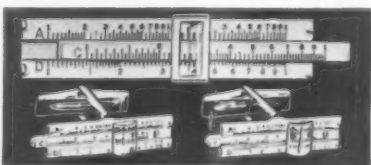


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PSYCHOLOGY

Youngsters See Moon Smaller as It Rises

THE YOUNGER you are, the smaller the moon appears as it rises.

Whether young couples holding hands under the Hunter's Moon are an exception to this finding has not been investigated.

However, Drs. H. Leibowitz, and T. Hartman of the University of Wisconsin's psychology department did test the reactions of 19 adults and 19 children to an overhead disk compared to a similar disk directly in front of them in an outdoor laboratory.

The relative size of the moon when viewed at different angles of observation was found to be different for adults as compared with children. As the moon rises it tends to look smaller, and the younger the observer, the smaller it looks.

The youngest children were off about 50%. The error decreased with increasing age to about 16% for adults. Ten adults and ten children confirmed these results in indoor experiments, Drs. Leibowitz and Hartman report in *Science* (Sept. 4).

Science News Letter, October 10, 1959

DEMOGRAPHY

College Graduates Marry Earlier, Have More Births

COLLEGE graduates are now marrying at a much earlier age than their parents. They are having children much sooner. They are having more children and are spacing them much closer together. And they seem to be following the general trend of the younger generation by completing their families earlier than their parents.

These findings based on inquiry were announced by the Population Reference Bureau, Washington.

Science News Letter, October 10, 1959

PLANT PHYSIOLOGY

Identify Growth Inhibitor In Peach Flower Buds

A POWERFUL growth inhibitor has been finally identified in "resting" peach flower buds.

Several scientists have reported finding the inhibitor, but none had been able to identify its chemical make-up. Dr. C. H. Hendershott and David R. Walker of the North Carolina State College report.

Results of their tests, described in *Science* (Sept. 25), "strongly indicate" that the inhibitor is naringenin. When tested in the laboratory, this compound, the aglycone or nonsugar-like portion of the glucoside naringin, was found to strongly inhibit the growth of the coleoptile. This is the protective sheath that surrounds the seed's primitive bud, the part of the seed that will develop into the bud.

Some 221 grams of peach buds produced about 140 milligrams of inhibitor.

Dr. Hendershott is now at the Citrus Experiment Station, Lake Alfred, Fla.

Science News Letter, October 10, 1959

MEDICINE

Eating While Drinking Reduces Pancreatitis

AMERICAN and Canadian alcoholics frequently develop pancreatitis while European alcoholics seldom do.

Possibly this is due to the fact that the European usually eats while drinking. The American gulps his drink straight or at least sips without food, Drs. Thomas T. White, Lloyd M. Nyhus and Donal F. Magee of the University of Washington School of Medicine explained to colleagues who visited their exhibit at the American College of Surgeons meeting in Atlantic City, N. J.

Other eating habits that appear to affect the development of this painful disorder include a sudden switch from a light diet to a heavy meal. For instance, they explained, an elderly person, whose normal diet consists of tea and biscuits, will often develop pancreatitis after eating a heavy meal on a holiday or family visit.

The much studied Bantu of Africa, who suffers from protein deficiency, will also develop pancreatitis and liver disease.

To return to the American, however, chronic pancreatitis is often found in the alcoholic. A special exhibit and explanation of this particular type of disorder was offered to the visiting surgeons by Drs. John M. Howard and Edward W. Ehrlich of Hahnemann Medical College and Hospital of Philadelphia.

Among 58 patients who had developed pancreatic calcification, 86% were alcoholics. Discovery of calcification in the pancreas should be the tip-off to the surgeon that the patient's pancreatic troubles are due to alcoholism, Dr. Howard explained.

Thus, the surgeon can avoid disappointing and ill-advised surgery, a common mistake when the trouble is diagnosed as gall-stone pancreatitis. Otherwise, surgery that is not specifically for pancreatitis caused by heavy drinking will result in overwhelming failure and pain will return to the patient. Among 21 patients so operated upon, pain returned to 19.

Science News Letter, October 10, 1959

OCEANOGRAPHY

Russian Instrument Measures Salinity

AN INSTRUMENT for measuring simultaneously the salinity, temperature and depth of sea water has been described by a Russian scientist.

Known as the bathythermosalinograph, the apparatus is accurate within one-hundredth of a degree centigrade for temperature and one-hundredth of a percent for salinity.

The instrument was used for observations at 18 stations during a recent expedition in antarctic waters of the Pacific. As a result of the expedition, G. Khundzhua of Moscow University told the International Oceanographic Congress meeting in New York, continuous records of depth, temperature and salinity were obtained in the upper 200-yard layer of the ocean area.

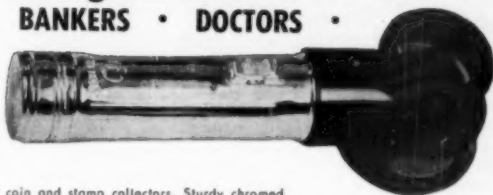
The apparatus also has proved highly effective in recording turbulent fluctuations with sharp salinity changes.

Science News Letter, October 10, 1959

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VETERINARY SCIENCE

Reserpine Tranquilizes Chickens and Turkeys

CALMER BIRDS in the hen house are predicted with the development of a tranquilizer for chickens.

A new product containing reserpine, a drug used to control high blood pressure and other human ills, has been developed by CIBA Pharmaceutical Products Inc., Summit, N. J. Added to the chickens' feed in very low concentrations it is said to help the chicken withstand stress.

Treated chickens had a higher survival rate and produced more and higher quality eggs than did hens on a standard diet. They also are not bothered as much by crowding, social maladjustment, temperature extremes and disease.

CIBA researchers claim the product is also economic because feed waste is reduced. The sedate treated chickens scratch less food out of the feeder and onto the ground.

Turkeys were included in the study. The drug is said to help control ruptured aorta, a deadly affliction of turkeys.

Science News Letter, October 10, 1959

ENGINEERING

Future Mining Engineers Must Be More Specialized

THE NEXT generation of mining engineers will face problems requiring a more intensive specialization than that characteristic of earlier generations.

Fields that need intensive study are properties of rocks under confining forces, effects of pressure release due to the mining operation, and the plastic and viscous flow of rocks in deep mining, Walfrid Been of Michigan College of Mining & Technology, Houghton, Mich., told the American Mining Congress in Denver, Colo.

Mr. Been said the intensification of the science background must be made at the cost of relinquishing time in some other area of training. However, he said, the danger of subordinating engineering qualities to a preoccupation with the scientific studies must be recognized.

Science News Letter, October 10, 1959

PLANT PATHOLOGY

Iron Relieves Virus Discoloration in Camellia

YELLOWISH spotting of leaves and white mottling of colored flowers are produced by a virus disease in camellias, but such symptoms can be relieved by a special application of iron.

This is reported by a horticultural research team at the University of California, Los Angeles. The team is composed of C. P. North, Dr. Arthur Wallace, Dr. G. F. Ryan and R. T. Mueller.

Addition to the soil immediately surrounding the diseased plant of relatively small amounts of a special iron compound completely removed all traces of virus dis-

coloration symptoms over a period of six to 12 months.

Gradually leaves returned to a full green color and the plant started producing solid colored flowers instead of the red and white variegated ones it had produced prior to treatment.

Although all symptoms of the disease disappeared following treatment, the virus remained in the plant and was still capable of infecting other plants. Subsequent new growth was similar to that of virus-free plants, but when the iron supply was depleted symptoms returned.

The iron was supplied in a compound known as a chelate, in which the iron is held in the vise-like grip of a chemically structured "claw." The iron deficiency apparently caused by the virus is little understood.

There appears to be some kind of interrelationship between chlorophyll and flower-pigment synthesis, iron level and the presence of virus in camellias.

Science News Letter, October 10, 1959

MEDICINE

Infections May Take More Lives Than Wars

INFECTIONS that have become resistant to antibiotics may soon take more lives than have been lost in some wars.

Dr. I. S. Ravdin, University of Pennsylvania School of Medicine, speaking at the scientific colloquium of the Northwestern University Medical School centennial, warned of the dangers of mass use of antibiotics while discussing problems now facing doctors.

In spite of the fact that bacterial genetics very early warned the medical profession that they must understand the basic laws of bacterial behavior, it was not long before doctors were again faced with the organisms which, while initially vulnerable to these newly found agents, had, because of indiscriminate use, become resistant to them.

The entire fault does not lie with the doctor, however, Dr. Ravdin pointed out. Many patients insist on receiving antibiotics which are capable of producing as much harm as the good they do when properly given, he said.

Another problem scientists face today, he continued, is the mystery of malignancy. More specific detecting tests and better methods of therapy are needed, he added.

"In spite of all the splendid fundamental and clinical research which is being done in this country, the practitioner finds it difficult to sift the wheat from the chaff, and the families of those suffering from widespread malignant disease wonder whether members of the medical profession are withholding information of value in the treatment of those patients," he said.

It is unthinkable that dedicated investigators would do this, he continued, but many people are not convinced that this is true. He then charged that certain members of the medical profession have "wittingly or unwittingly" encouraged people in this belief.

Science News Letter, October 10, 1959

IN SCIENCE

SURGERY

X-Ray of Tumor Inhibits Spread Through Body

A LITTLE X-ray appears to go a long way toward preventing tumor cells from leaving their malignant mother and spreading through the body of a mouse.

Two researchers from the National Cancer Institute, Bethesda, Md., explained to colleagues at the American College of Surgeons meeting in Atlantic City, N. J., how small doses of radiation on mouse tumors significantly inhibited the spread and growth of more tumors when cells from the primary tumor were injected into mice.

A group of tumors was given 200 roentgens and observed, Drs. Robert C. Hoyer and Robert R. Smith explained. Some of the tumors were removed from the mice after 24 hours. These tumors were converted to cell suspensions and injected into other mice. Other tumors in other mice received the same treatment, except that they received radiation doses varying from 170 to 2,000 roentgens.

Results indicate that the ability of these X-ray-exposed cells to metastasize was significantly reduced. For instance, a dose of 715 roentgens caused a 50% reduction in the number of pulmonary implants.

Irradiation of tumor DBA-49 with 2,000 roentgens brought no response in the size of the tumor, but injection of a cell suspension of this tumor reduced the number of metastases from 113 to two tumors per mouse, they reported.

Science News Letter, October 10, 1959

ICHTHYOLOGY

True Albino Hagfish Found Off California

AN ALBINO hagfish, believed to be the first record of this "natural freak," has been found off the coast of southern California.

During a routine collection of hagfish, Dr. David Jensen of the Scripps Institution of Oceanography reports finding the single albino among some 500 fish. Over the past two years, he says, he has collected about 5,900 hagfish. About 20 of these were piebald with areas of pale pink skin because of reduced pigmentation.

Ordinarily, the hagfish (*Eptatretus stoutii*) is pinkish to purple gray with the lighter color on its stomach. The albino specimen, described in *Science* (Sept. 25), is white except for a pinkish cast due to the blood flow.

The pulsations of the caudal, or tail, heart are plainly visible under the albino hagfish's translucent skin, Dr. Jensen says. The hagfish is one of the most primitive vertebrate animals.

Science News Letter, October 10, 1959

ICE FIELDS

GEOPHYSICS

Arctic Ocean Is Poor In Small Plant Life

THE ARCTIC Ocean has been found to be one of the most barren of the world's oceans.

Although it comprises 1/23 the area of all oceans, it contributes only about 1/1,000 of the total oceanic production of small plant and animal life, a basic food for larger marine life.

This conclusion is based on studies made prior to and during the International Geophysical Year and reported by the U. S. National Committee for IGY of the National Academy of Sciences. The studies involved measurements of the amount of photosynthesis taking place in the Arctic Ocean and of the concentrations of chlorophyll and nutrients in the water.

Ice-free Arctic waters may develop a maximum chlorophyll concentration as much as 13 times that found in the ice-covered Arctic Ocean, it was found.

But even if the small amount of sunlight penetrating the Arctic ice did not limit the growth of tiny plant life, the Committee said, the poverty of the Arctic Ocean in nitrate and phosphate nutrients would still make its productivity level one of the lowest in the world.

Science News Letter, October 10, 1959

GENERAL SCIENCE

Lord Russell Advocates Creation of World Body

LORD Bertrand Russell recently said that mankind must soon choose between accepting extinction or creating a powerful world authority with a monopoly on the major weapons of war.

Lord Russell, world-famous philosopher, mathematician and Nobel Prize winner, spoke as one of the six renowned panelists at a symposium in New York on "The Future of Man," marking the dedication of the new headquarters of Joseph E. Seagram & Sons. Dr. Milton S. Eisenhower served as chairman.

The other panelists were Dr. Ashley Montagu, anthropologist and author; Robert Frost, poet, educator and four-time Pulitzer Prize winner; Sir Julian Huxley, biologist and author; Devereaux C. Josephs, chairman of the President's Committee on Education Beyond the High School, and Dr. Hermann J. Muller, zoologist and Nobel Prize winner.

The fate of the world, contended Lord Russell, depends on the selection of statesmen to further a world authority that can allow man to enjoy the "universal well-being which science has made attainable."

Dr. Montagu explained that man has become adept at learning, not only more sound things than any other creature, but more unsound things.

"The result," he said, "is not intelligence, but confusion."

He proposed a specialized education "conceived as the science and art of human relations plus the critical ability to use one's mind critically." This would require a re-evaluation of our present modes of instruction, which he believes fail to meet his definition of education as "humane discipline of the whole person."

Sir Julian urged man to take immediate steps to work out a world population policy to prevent erosion of the world's resources. Such steps, he said, "would lead to the development of a 'Fulfillment Society' to replace the Welfare State."

In the coming century, he said, man's first job will be to think collectively, in terms of continuing the human species as a whole.

"The faith of the future will be in the possibilities of the human species, and the power of human knowledge to realize them more effectively."

Science News Letter, October 10, 1959

PUBLIC HEALTH

Little Is Known About Most Damaging Poison

BOTULISM, caused by nature's most damaging poison, today remains a mystery to the scientific world.

Since the canning industry solved the problem of killing the botulism organisms, this dread poison ceased to be a threat. However, there is much work yet to be done in this field, Dr. Carl Lamanna of the Naval Biological Laboratory at the School of Public Health, University of California, reports in *Science* (Sept. 25).

There are five strains of botulism organisms, labeled A, B, C, D and E. Whether or not there are other types has yet to be determined.

Food poisoning in man by toxin types A, B and E have been reported frequently. Botulinal toxins are unquestionably the most potent poisons known, the health officer says. Botulism results in vomiting, abdominal pain, difficult vision, dryness of the mouth, nervous disorders and a barking cough in man. There have been 13 cases of botulism in the United States this year.

Most of the scientific work on botulism has centered around the type A toxin. This is probably due to the fact that Type A is the cause of botulism in humans, Dr. Lamanna speculated. In addition, culture collections of a number of strains of type A bacilli readily produce large quantities of toxin, poison producers, in the laboratory.

The problem at hand is to study the other types and learn as much about them as science now knows about type A, he stressed. Science does not yet know what, in the molecular structure of these poisons, causes their specificity and extraordinary toxicity.

There has been a decline in interest in botulism, he said.

"It is to be hoped that no new threat will be needed to generate a renewed wave of investigations," he concluded.

Science News Letter, October 10, 1959

ENGINEERING

Foresee Atomic Reactors For Industrial "Heat"

USE OF ATOMIC reactors for generating industrial "process heat," the sort of low-temperature heat needed in myriads of manufacturing operations, may be near. Conceivably this might bring industry to areas now lacking it, or help hold prices down under favorable economics.

Representatives of the Atomic Energy Commission and industry met Oct. 1 at Germantown, Md., to discuss "development and potential industrial uses of reactors for the production of low-temperature process heat."

About 400 persons heard how process heat reactors could be used in workhorse jobs for production of metals, glass and cement and petroleum, coal, chemical, food and paper products, or how they could be used to heat buildings and ovens, or generate heat for converting salt water into water for drinking or irrigation.

Possible advantages of nuclear process heat over conventional heat, the AEC believes, include elimination of smokestack wastes and sharp reduction in space needed for fuel storage.

Use of process heat reactors would also enable planners to eliminate "fuel source" as a factor in deciding where to put a new plant. Moreover, the reactors could produce radioactive isotopes and plutonium as by-products.

Science News Letter, October 10, 1959

AGRICULTURE

Treated Sewage Water Improves Crop Yield

IRRIGATION with waters carrying effluent from city sewage disposal systems can greatly increase crop yields, University of Wisconsin tests have indicated.

In an experiment with waters of a creek carrying effluent from the Madison sewage disposal system, C. J. Chapman, University soils specialist, and J. W. Clark, Dane County extension agent, found that the use of the effluent increased the dry matter forage yield of a pasture by 400 pounds an acre.

When 1,000 pounds of 16-8-8 commercial fertilizer was broadcast and then soaked in with the effluent, the yield increased from 2,400 pounds an acre to 12,500 pounds.

University tests have shown the effluent contained 24.8 parts per million of nitrogen, 25.7 parts of phosphorus and 13.1 of potash. There was also some sodium, but the tests showed that it would not become toxic because normal rainfall leached it out of the soil.

The researchers estimated that in a normal year ten inches of effluent could be added to soils, and this would contain the equivalent of 300 pounds of 20-20-10 commercial fertilizer per acre.

They suggested that where the value of sewage effluent is proved, it would be a simple matter to pipe it or run it through a ditch for disbursement on crop bearing lands.

Science News Letter, October 10, 1959

EDUCATION

Fall Is School Science Time

With school under way, the rush toward science accelerates. By the hundreds of thousands, young scientists are experimenting in their own time.

By WATSON DAVIS

IT IS SCIENCE time again for bright eager boys and girls in the nation's high schools. As science classes begin, so do the out-of-hours experimentation and study of young scientists in junior and senior high school, and even earlier grades.

October has been designated as "National Science Youth Month." Students, parents, industrialists, community leaders, and especially teachers, are urged to help inspire and inform youth in our schools as to the opportunities, need and qualifications of scientific and technological manpower.

This is the time of year that budding scientists, John and Mary, decide to do a project in spare time that can be entered in one of the thousands of science fairs held in schools next March and April. They go to their science teachers and get advice on what would be interesting to do. Perhaps the teacher will suggest some of the projects that are listed in Science Clubs of America, SCIENCE SERVICE sponsored, information. The teacher may turn to a list of needed research that young people are likely to be able to undertake which has been compiled. There is a booklet on "Thousands of Science Projects" that contains titles of experiments that have been done in the past by young scientists. (SCIENCE SERVICE, Washington 6, D. C., 25 cents postpaid.)

Parents will be persuaded at a PTA meeting in October that it is perfectly normal for the son or daughter of the household to want to keep white mice in the bedroom or turn a corner of the garage into a laboratory.

Old timers among the students, who have won honors in science fairs, will help the younger students get started.

Help for the Young Scientist

Some of the problems that confront the young researcher are too advanced and complex for even the science teachers to answer. The young scientist must go to the sophisticated science literature, the journals and the books that research scientists consult. Or he will get aid from a friendly grown-up scientist, engineer, doctor or other professional who volunteers to help get the young scientists over the rough places.

Usually in each locality there will now be found a council or committee of such professionals who give help to the running of science fairs. They are joined by newspaper editors, college professors, service club officers, industrial executives and others who help in organizing and securing support for science youth activities.

Sometime during October this fair committee is likely to hold a meeting of young scientists eager to do projects. They are invited to meet the professional scientists and engineers and discuss their intended projects. Gathering in a gymnasium or other large area, the experts, making known their specialties by holding up signs such as "Electronics" or "Medicine" or "Biochemistry", thus invite questions. Often there develop scientific friendships that persist for years.

A science club, usually with a teacher as adult sponsor, is to be found in almost every public, private and parochial secondary school and often in elementary school as well. The sponsor enrolls the group as a unit of Science Clubs of America and receives without charge information about science including a sponsor handbook full of hints that make easy the organizing of the eager young scientists for rewarding science activity.

STS Competition

Industrial and educational organizations cooperate by offering free and low cost science materials that can be obtained for the trouble and price of a postcard request. Hundreds of such offers are listed in the Science Clubs of America Sponsor Handbook.

Each fall the high school seniors most promising in science get ready to compete in the climaxing Science Talent Search. Their teachers ask for examination materials from SCIENCE SERVICE, the students write a report on one of their experimental projects, and just after Christmas the cream of American youthful scientific effort is assembled for review and judgment.

One out of ten who enter are recommended to colleges as worthy of special attention from admissions offices, and 40 of the students are invited to Washington to receive Westinghouse scholarships and awards.

Today there is much more encouragement and appreciation of science both in formal classes and as hobby activity. This is a result of the growing appreciation of the need for technical and scientific personnel in industry, defense and ordinary living. Russian competition in space and education has accelerated the place of science in our schools, but that is not the whole story. Even without the cold war, there would still be need for stepped-up science.

Fall is an appropriate time for those in high school to begin thinking about careers and colleges. This should not be delayed

much beyond the junior year, but the earlier the better.

Here is advice being given to students who wish to consider science and engineering as their life-work:

Any boy or girl who has the initiative and aptitude should consider a career in science or engineering.

The important step toward future success is to take as much science and mathematics as you can, in junior and senior high school. Take the "hard" or "tough" courses, for to those who are to be the scientists and engineers of the future these courses will be "fun" in the sense that they will be enjoyable and rewarding.

Plan your high school courses so that you will have the requisites for entering the college of your choice. Most science and engineering courses in college need in their prerequisites: algebra, one and a half to two units; plane geometry, one unit; solid geometry, one-half unit; chemistry, physics or biology, with laboratory work, one or two units, preferably a unit or more in each; also preferably trigonometry, one-half unit. A good rule would be to take all the mathematics and science your high school offers.

Try to get good grades because entrance into college is difficult for those who have low grades. Entrance into college promises to become increasingly competitive.

Experiment in science and do projects on your own as a hobby. This is the best way to gain experience in science and technology. Enter your science projects in science fairs, first in your own high school, and then, if you qualify, in the local and regional science fair. Aspire to be one of the finalists from your science fair to the National Science Fair held each year in May, the culminating annual event for science experimenters.

Read science literature. Subscribe to magazines and consult other literature in libraries. Build your own shelf of basic and reference books. If you demonstrate a serious, intelligent interest, you can probably arrange to have access to the library of some research or industrial laboratory in your vicinity.

Scientific Friendships

Go to professional scientific meetings in the fields of your interest if you can do so without interfering with your school work. Serious young scientists normally are welcome at such meetings.

Get acquainted with professional scientists and engineers in your areas of interest. Do not bother them with questions you can answer yourself by looking them up in books or by experimenting. They will probably enjoy helping you when you encounter difficulties or puzzling situations.

Minimize time spent in meetings that are just talk, but join and participate in your science club. If there is no science club in

(Continued on page 240)

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Fall Is Science Time

(Continued from page 238)

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Science News Letter, October 10, 1959

EDUCATION

Accidental Hunting Death Starts Gun-Safety Class

THE ACCIDENTAL hunting death of a New Hampshire teenager has resulted in the establishment of instruction in gun safety in ten states.

When 17-year-old Robert Brock of Dover, N. H., was killed due to an accidental firing, his father decided something had to be done about teaching boys how to handle firearms.

Charles Brock, together with Delwyn Main, also a hunter, started by training children in their spare time. Soon instruction was a regular extra-curricular activity at Dover High School.

The idea spread and, before long, the state legislature passed a bill authorizing any school district to offer a course in firearms safety, good hunting practices and game laws. Nine other states—Vermont, Arizona, California, New York, Virginia, Ohio, North Dakota, Maine and Washington—and many individual school districts have since set up programs based on the New Hampshire plan.

The value of the gun-safety programs is shown by the results in New Hampshire, *Today's Health* (Oct.), published by the American Medical Association, reports. There, three hunting seasons have gone by without a single death. Previously, the hunting season produced two or three shooting fatalities every year.

Gun safety programs stress these points:

1. Treat every gun as it were loaded.
2. Keep the action open except when ready to fire.
3. Be sure of your backstop and of your target.
4. Never mix alcohol with gunpowder.
5. Never hunt with persons in front or in back of you. Keep in an even line side by side.
6. Know your gun and ammunition.

Science News Letter, October 10, 1959

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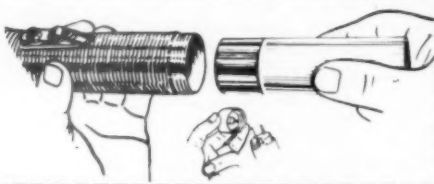
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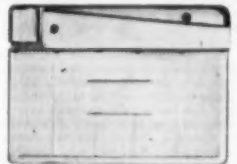
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Books of the Week

For the editorial information of our readers, books received for review since last week's issue are listed. For convenient purchase of any U. S. book in print, send a remittance to cover retail price (postage will be paid) to Book Department, Science Service, 1719 N. Street, N.W., Washington 6, D. C. Request free publications direct from publisher, not from Science Service.

ADVENTURES WITH THE MISSING LINK—Raymond A. Dart with Dennis Craig—*Harper*, 255 p., illus., \$5. The full story of the discovery of "Dart's Baby," the Taung's Skull, and the subsequent findings and deductions about *Australopithecus*, the South African ape-man.

ALL ABOUT ARCHAEOLOGY—Abbie Terry White—*Random House*, 148 p., illus. by Tom O'Sullivan, photographs, \$1.95. Conveys to the young reader an understanding of how archaeological discoveries link the world of the ancients with the world of today.

ALL ABOUT THE ICE AGE—Patricia Lauber, foreword by William L. Donn—*Random House*, 151 p., illus. by John C. Wonseller, photographs, \$1.95. Scientific story for children about the evidence and causes of the last Ice Age.

ANGLO-AMERICA: A Regional Geography—Earl B. Shaw, cartography by Jameson MacFarland—*Wiley*, 480 p., illus., \$7.75. Textbook showing the relationship between regional land use and actual geographic environment on the continent of North America.

ATOMIC MEDICINE—Charles F. Behrens, Ed.—*Williams & Wilkins*, 3rd ed., 705 p., illus., \$15. Extensively revised reference volume, with new chapters on skin lesions from fallout, and on the results to the body of radio isotopes which gain internal access.

BEFORE AND AFTER DINOSAURS—Lois and Louis Darling—*Morrow*, 95 p., illus. by authors, \$2.95. Ample illustrated story of amphibians and land animals that lived millions of years ago.

BIOLOGICAL AND ENVIRONMENTAL EFFECTS OF NUCLEAR WAR: Summary Analysis of Hearings—Jt. Committee on Atomic Energy, U. S. Congress—*Govt. Print. Off.*, 58 p., illus., paper, \$1.25. Contains fallout pattern charts, see story SNL July 4, 1959, p. 5.

BOILING WATER REACTORS: An Annotated Bibliography of Selected Literature—James M. Jacobs, AEC Technical Information Service—*Off. of Tech. Serv.*, 48 p., paper, \$1.50.

A BOOK TO BEGIN ON WEATHER—Leslie Walker—*Holt*, unpag., illus. by Tom Funk, \$2.50. Tells the how and why of weather for the very young reader.

COMMAND DECISIONS—Office of the Chief of Military History, Dept. of the Army, Ken Roberts Greenfield, Ed., introd. by Hanson W. Baldwin—*Harcourt*, 481 p., maps, \$5.95. Concise history of U. S. Army's participation in World War II, based both on our own and our Allies' records, and on enemy documents.

CONTEMPORARY GEODESY: Proceedings of a Conference Held at the Harvard College Observatory-Smithsonian Astrophysical Observatory, Cambridge, Mass., Dec. 1-2, 1958—Charles A. Whitten and Kenneth H. Drummond, Eds.—*Am. Geophysical Union*, Monograph No. 4, 95 p., illus., \$5.50. On geodetic fundamentals and problems of modern and space geodesy.

CURIOUS NATURALISTS—Niko Tinbergen—*Basic Bks.*, 280 p., illus., \$5. Study of the behavior of animals in their natural environment, an autobiographical account of the joys of biological field work.

THE FOUNDATIONS OF HUMAN EVOLUTION—Sir Wilfrid E. Le Gros Clark—*Oregon State System of Higher Educ.*, 74 p., illus. by Christine Court, paper, \$1. Condon Lecture, interpreting the present position of the theory of

natural selection with reference to human evolution.

THE GOLDEN BOOK OF WILD ANIMAL PETS—Roy Pinney—*Golden Press*, 68 p., photographs by author, \$1.95. Tells boys and girls how to find and care for animals of the wood, field and stream.

HISTORICAL ATLAS AND GAZETTEER: A Study of History, Vol. XI—Arnold J. Toynbee and Edward D. Myers—*Oxford Univ. Press*, 257 p., 73 maps, \$12.50. Reference volume, contains among others maps of the Nomad, Sumeric, Egyptian, Minoan and Mayan civilizations.

HYPOTHERMIA—A. Cecil Taylor, Ed.—*N. Y. Acad. of Sciences, Annals* Vol. 80, Art. 2, 265 p., illus., paper, \$3.50. Recent findings of the properties of the hypothermic state, at both physiological and biochemical level.

INVENTIONS, PATENTS, AND THEIR MANAGEMENT—Alf K. Berle and L. Sprague de Camp—*Van Nostrand*, 602 p., illus., \$12.50. Intended to serve as a guide to the inventive, legal, and commercial procedure involved in developing an idea into a profitable product, illustrated by 44 actual cases.

JOURNAL OF RESEARCH: A. Physics and Chemistry, Vol. 63A, No. 1—National Bureau of Standards, U. A. Fano, Ed.—*Govt. Print. Off.*, 100 p., paper, 70¢, annual subscription (6) \$4. Initiates NBS's separate section covering the science of measurement, fundamental constants and properties of matter.

THE KENNECOTT LECTURE SERIES 1959-1960—L. V. Berkner and others, foreword by Richard A. Harvill—*Univ. of Ariz. Press*, 103 p., paper, single copies free upon request direct to publisher, Tucson, Ariz. Four lectures on the impact of science on contemporary civilization.

LECTURES ON FOURIER INTEGRALS WITH Author's Supplement on Monotonic Functions, Stieltjes Integrals and Harmonic Analysis—Salomon Bochner, transl. by Morris Tenebaum and Harry Pollard—*Princeton Univ. Press*, 333 p., paper, \$5.

MEN AND ATOMS: The Discovery, the Uses and the Future of Atomic Energy—William L. Laurence—*Simon & Schuster*, 302 p., \$4.50. The history of the atom, written by the science editor of the N. Y. Times, who witnessed the first atomic bomb test and the bomb dropped on Nagasaki.

METAMORPHOSIS: On the Development of Effect, Perception, Attention and Memory—Ernest G. Schachtel, *Basic Bks.*, 344 p., \$6. Psychoanalyst shows that, side by side with regressive tendencies stressed by Freud, the newborn infant also tends toward the world, attracted by stimuli, enjoying the exercise of his growing capacities.

MINERALOGY: Concepts, Descriptions, Determinations—L. G. Berry and Brian Mason—*Freeman*, 612 p., illus. by Roger Hayward, photographs, \$8.75. Undergraduate course.

MODES AND NATURAL FREQUENCIES OF SUSPENSION-BRIDGE OSCILLATIONS—D. B. Steinman—*N. Y. Acad. of Sciences, Annals*, Vol. 79, Art. 4, 33 p., paper, \$2.50. Tested formulas required in studies of aerodynamic stability, with numerical examples based on computations for the Mackinac Bridge.

NATIONAL RESEARCH COUNCIL OF CANADA, 1958-59, 42nd Annual Report—E. W. R. Steacie, Pres.—*Nat. Res. Council*, 74 p., paper, single copies free upon request direct to publisher, Ottawa, Canada. English and French.

A NATURAL HISTORY OF NEW YORK CITY: A Personal Report after Fifty Years of Study & Enjoyment of Wildlife within the Boundaries of Greater New York—John Kieran—Houghton, 428 p., illus. by Henry Bugbee Kane, \$5.75. A wealth of scientific facts of plant and animal life, of dry land and marsh, of pond and sea, within the limits of a huge city inhabited by millions.

ORGANIC CHEMISTRY: A Brief Course—Ray O. Brewster and William E. McEwen—Prentice-Hall, 2nd ed., 401 p., illus., \$10. Completely revised textbook for one-semester course.

OUT OF THE SKY: An Introduction to Meteoritics—H. H. Nininger—Dover, 336 p., illus., paper, \$1.85. For the general reader, reprint of 1952 first edition.

THE PHYSICS OF ELECTRICITY AND MAGNETISM—William Taussig Scott—Wiley, 635 p., illus., \$8.75. Text for juniors, seniors and first-year graduate students, presenting a balance between theory and experiment, using modern atomic approach to present phenomena.

PRISMS AND LENSES—Jerome S. Meyer—World Pub. Co., 64 p., illus. by John Polgreen, \$2.50. Explains for young readers the principles of light and the practical application of prisms and lenses.

PURCHASE GUIDE FOR PROGRAMS IN SCIENCE, MATHEMATICS, MODERN FOREIGN LANGUAGES—Council of Chief State School Officers—Ginn, 336 p., paper, \$3.95. First of its kind, a guide designed to assist in the wise and economical purchase of equipment and materials for public instruction.

THE ROSCOE B. JACKSON MEMORIAL LABORATORY, Bar Harbor, Maine 1929-1959: Thirtieth Annual Report 1958-1959—Earl L. Green, Dir.—Roscoe B. Jackson Memorial Laboratory, 111 p., illus., paper, single copies free upon request direct to publisher, Bar Harbor, Maine. Reports on research projects under way.

THE SCIENCE OF MECHANICS IN THE MIDDLE AGES—Marshall Clagett—Univ. of Wis. Press, 711 p., illus., \$8. Presents, mainly in the author's translation, documentary material basic to the study of medieval statics, kinematics and dynamics in the period before Galileo.

SKID PREVENTION RESEARCH 1959—T. E. Shelbourne and others—Highway Res. Bd., Bull. 219, 73 p., illus., paper, \$1.40. Summary reports of papers presented at 38th annual meeting.

SKY SENTRY: A SAC Crewman in Service—Arnold Brophy, foreword by Col. O. F. Lassiter, USAF—Dodd, 95 p., photographs, \$2.75. Popularly told story of the Strategic Air Command.

SOLID STATE PHYSICS: Advances in Research and Applications, Vol. 9—Frederick Seitz and David Turnbull, Eds.—Academic, 548 p., illus., \$14.50. Articles on electronic spectra, polar semiconductors, static electrification of solids and other aspects of solid state physics.

SOURCE BOOK OF THE NEW PLASTICS—Herbert R. Simonds, Ed.—Reinhold, 354 p., illus., \$10. Includes improvements in established materials, producers' new materials, federal-sponsored research and brief patent survey.

SPACE AGE DICTIONARY—Charles McLaughlin, Ed.—Van Nostrand, 128 p., illus., \$5.95. Concise handbook of basic information on rockets, satellites and space flight in non-technical language, including missile data up to July 1959.

STUDIES OF HIGHWAY DEVELOPMENT AND GEOGRAPHIC CHANGE—William L. Garrison and others—Univ. of Wash. Press, 291 p., maps, \$7.50. Findings of research on the changes in urban development and the extent of land utilization in response to highway improvements.

THE SUN, THE MOON AND THE STARS—Mae and Ira Freeman—Random House, 84 p., illus. by Rene Martin, \$1.95. Covers basic material in simple language young children can understand.

(Continued on page 244)

ADVENTURE, RESEARCH, EXPLORATION— BOOKS FOR YOUNG SCIENTISTS

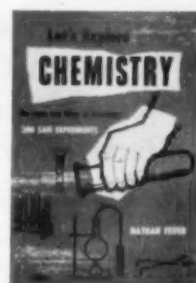
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"Hunting With The Microscope" by Johnson and Bleifeld. How to use microscope. Preparing slides, stains, cultures. Cells and molds. Tissue regeneration. Live blood-stream under microscope. Your microscopic garden and zoo. Photomicrographs with your camera. Detecting fingerprints, bloodstains, forgeries. Food, tobacco, textile adulterations. 58 dwgs. and photos. 136 pgs. \$1.00.

"Discover the Stars" by Adler and Johnson. Astronomy made simple. Secrets of sun's energy. Radio Astronomy. Astral navigation. Calendar. Tides. Make your own Sextant, sun-dial, clinometer. Illustrated instructions to build simple schematic model of Vanguard Satellite. How it works. Photograph star trails. Map solar systems in umbrella. Latitude and longitude. 152 pages, 91 photos and dwgs. \$1.00.



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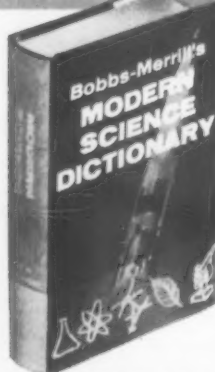
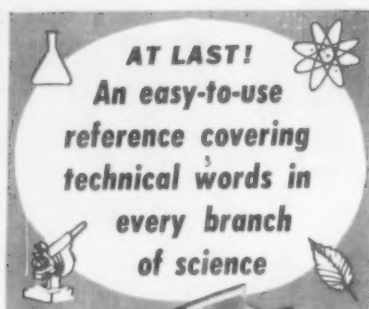
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Books of the Week

(Continued from page 243)

TEACHING THE THIRD R: A Comparative Study of American and European Textbooks in Arithmetic—Charles H. Schutter and Richard L. Spreckelmeyer, introd. by Max Beberman—*Council for Basic Education*, 46 p., paper, \$1.

THE THIRTEEN STEPS TO THE ATOM: A Photographic Exploration—Charles-Noel Martin, transl. from French by B. B. Rafter—*Watts, F.*, 256 p., 118 photographs, \$4.95. Shows objects of increasing minuteness from snowflakes to electrons, with concise scientific text.

THIS IS NATURE: Thirty Years of the Best from Nature Magazine—Richard W. Westwood, Ed.—*Crowell*, 214 p., illus. by Walter W. Ferguson, 100 photographs, \$5.95. Editor's selection of the fifty finest nature stories published since 1923.

THIS WORLD OF LIVING THINGS—Paul Griswold Howes—*Duell*, 232 p., illus. by author, \$4.50. Naturalist shares with the reader his observations about widely diversified creatures, showing nature's complexities and refinements, in simple language the general reader will enjoy.

TOO MANY ASIANS—John Robbins—*Double-day*, 215 p., \$3.95. A journalist's account of the current population explosion in India, China and 17 other Asian countries he visited.

TROPHOBLAST AND ITS TUMORS—William B. Ober, Ed.—*N. Y. Acad. of Sciences, Annals*, Vol. 80, Art. 1, 284 p., illus., paper, \$3.50. Papers on fundamental concepts of trophoblastic growth, hydatidiform moles and aspects of choriocarcinoma in men and women.

UNDERSTANDING TRANSISTORS: Allied's Handbook of Transistor Fundamentals—Milton S. Kiver, Ed.—*Allied Radio Corp.*, 64 p., illus., paper, 50¢. Basic theory and concise introduction to transistor electronics.

UNITED STATES FOREIGN POLICY, Study No. 2: Possible Nonmilitary Scientific Developments and Their Potential Impact on Foreign Policy Problems of the United States—Stanford Research Institute—*Senate Committee on Foreign Relations*, 100 p., paper, single copies free upon request direct to publisher, U. S. Congress, Washington 25, D. C. Explores U. S. scientific developments of the next decade.

VANISHING CRAFTS AND THEIR CRAFTSMEN—Rollin C. Steinmetz and Charles S. Rice—*Rutgers Univ. Press*, 160 p., photographs, \$4.75. Portrays craftsmen who still prosper in our time in spite of assembly-line competition, such as the lime burner, the potter and the one-room school teacher.

THE WHALES GO BY—Fred Phleger—*Beginner Bks. (Random House)*, 62 p., illus. by Paul Galdone, \$1.95. A true story for the youngest readers.

WHAT DOES A SCIENTIST DO?—Hatty Zarchy—*Dodd*, 64 p., photographs, \$2.50. Shows scientists at work in laboratory, observatory, factory and field.

WHAT MAKES A SCIENTIST?—George H. Waltz, Jr.—*Doubleday*, 142 p., illus., \$2.95. Twelve informal biographies of American-born and American-educated scientists, among them Selman Waksman, Glenn Seaborg, Fred Whipple and James Van Allen.

WONDERS OF THE REPTILE WORLD—Helen Gere Cruickshank—*Dodd*, 64 p., illus. by Lon Ellis, \$2.95. Stories of fossils and living reptiles, from brontosaurus to the garter snake.

THE YOUNG INVENTORS' GUIDE—Raymond F. Yates—*Harper*, 104 p., illus., \$2.50. Addressed to young readers interested to apply themselves as improvers in the fields of technology and science, explaining the process of patenting inventions.

ZULU JOURNAL: Field Notes of a Naturalist in South Africa—Raymond B. Cowles—*Univ. of Calif. Press*, 267 p., photographs, \$6. Com-

pilation of selected materials based on the author's technical journals prepared during two field trips, capturing the mood of the country, its seasons and people.

Science News Letter, October 10, 1959

Questions

AGRICULTURE—What effect did irrigation with sewage water have on crop yield? p. 237.

PLANT PHYSIOLOGY—What is the probable name of a new growth inhibitor in peach buds? p. 234.

ROCKETS AND MISSILES—How far up above the earth was the satellite from which the cloud cover photograph was taken? p. 229.

SURGERY—For how long a time did a dog's heart survive without a blood supply? p. 230.

Photographs: Cover, National Aeronautics and Space Administration; p. 229, California Institute of Technology Jet Propulsion Laboratory; p. 246, The Camp Co., Inc.

PALEONTOLOGY

Fossil Plants Clues To Ancient Climate

FOSSIL PLANTS are jigsaw puzzle clues to the climate, vegetation and geologic structure of Nevada as it existed from 15,000,000 to 30,000,000 years ago.

Since 1936, Dr. Daniel I. Axelrod, professor of geology at the University of California, Los Angeles, has studied plant remains preserved in the rocks of the Far West, trying to fill a large gap in the geological history of the region.

By comparing the fossil plants with their modern relatives, he has constructed a map of ancient Nevada in which the present deserts were covered with luxuriant pine-forest, the climate was humid, summer rains abundant, and today's 10,000- to 14,000-ft-high Sierra Nevada range was only a gentle 2,000-foot slope.

Over millions of years, as the oceans gradually chilled, the continents grew drier, and mountains and glaciers rose, the summer rains decreased and some of the old plants died out.

Dr. Axelrod has mainly studied the plants and trees of the Pliocene epoch during past years, making annual field trips to the Great Basin, which takes in most of Nevada and neighboring parts of California, Oregon, Idaho, Utah and Arizona.

During the next three years, supported by a \$20,000 National Science Foundation grant, he will go even further back into the history of the Basin. The UCLA geologist will investigate the plant fossils of the Miocene epoch, reconstructing the topography and flora of the area some 15,000,000 to 30,000,000 years ago.

Science News Letter, October 10, 1959



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New Machines and Gadgets

For sources of more information on new things described, send a self-addressed stamped envelope to SCIENCE NEWS LETTER, 1719 N St., N.W., Washington 6, D.C., and ask for Gadget Bulletin 1008. To receive this Gadget Bulletin without special request each week, remit \$1.50 for one year's subscription.

LATEX PAINT is said to give a 50% increase in the number of days you can paint outside. The paint can be applied directly to previously painted surfaces, or to new wood after using the latex primer, and dries in an hour. It spreads smoothly on dewy surfaces, and can be applied to surfaces immediately before or after a rainfall. In 15 minutes, the paint surface has hardened so that bugs are no longer a problem.

Science News Letter, October 10, 1959

ROTARY FEATHER DUSTER whirls as the housewife squeezes the handle. Designed for homes, stores, offices, and factories, the mechanical duster can be detached from its handle, washed, or replaced with a refill duster.

Science News Letter, October 10, 1959

FLOATING FIRST-AID KIT is especially adapted for boatmen and fishermen. The waterproof kit contains the usual bandages, adhesive rolls and strips, ammonia inhalants, scissors, and salves for burns among its 13 items. A smaller size contains nine items.

Science News Letter, October 10, 1959

LEAK-STOPPER, for masonry walls or floors, consists of rubber-silicone liquid and



special dry hydraulic cement which can be mixed for use in three minutes. The user forms a cone-shaped plug, as shown in the photograph, and rams it into the hole, holding it about five minutes. The material expands as it sets and forms a watertight seal. The material also may be used for sealing pipe joints and caulking around windows.

Science News Letter, October 10, 1959

LABORATORY LOTION is for chemists who work with acetone, methanol, ether,

and glassware detergents, or other persons who must wash their hands frequently. Its high lanolin content is designed to prevent hands from chapping and cracking. The scented, non-greasy formulation comes in 16-ounce bottle with pump dispenser.

Science News Letter, October 10, 1959

PLASTIC MARKING INK, for use on treated or untreated polyethylene, grips the plastic firmly and does not chip when flexed. The ink is good for decorating toys or for labeling squeeze containers.

Science News Letter, October 10, 1959

LAYOUT DEVICE for home craftsmen, as well as professional bricklayers, excavators and contractors, allows the user to stake out quickly and accurately the 90-degree angles of construction and plotting. Made of hard-alloy aluminum, the device is useful in the building of patios, sidewalks, fences and walls, and in landscaping.

Science News Letter, October 10, 1959

HOME MOSAIC SET lets the hobbyist paint by the numbers with special "liquid tile" paint, creating a mosaic picture that resembles one actually made of little tiles. Set has two tile boards, 28 paints, thinner, three brushes, cleaner, mosaic grout and instructions.

Science News Letter, October 10, 1959



Nature Ramblings



By HORACE LOFTIN

POISED DELICATELY over a blossom, its bill probed deeply within the petals in search of nectar and tiny insects, the hummingbird seems to be standing motionless in mid-air. But bright glints of color appearing as a blur by its side reveal its rapidly moving wings.

Indeed the hummingbird is far from being an idle creature. Considering its size, it consumes a tremendous amount of energy.

Scientists are able to calculate the amount of energy used by an animal in its life activities per unit weight; this is called the metabolic rate. Of all animals, the resting hummingbird has the highest known metabolic rate. When flying, the hummingbird's metabolic rate is about six times greater than when at rest!

Anything that consumes energy must of course take in fuel, or food, to produce this energy. The faster the organism or the

Deep Sleepers



engine runs, the more fuel will be used. Thus, if a hummingbird were to maintain this high expenditure of energy all day long, the bird could scarcely find food as fast as it would be burned up. In other words, it would have to eat for 24 hours a day just to keep alive.

This certainly is not the case. How, then, does the hummingbird manage to reduce its "fuel consumption"?

Sleeping hummingbirds enter a torpid

state, almost like the winter sleep of hibernating animals. The metabolic rate (energy consumption) is only about a twelfth of the rate of the resting bird. In this deep sleep, the hummingbird has a reduced body temperature and feels cold to the touch. It is motionless. If suddenly startled awake, it could not fly away immediately.

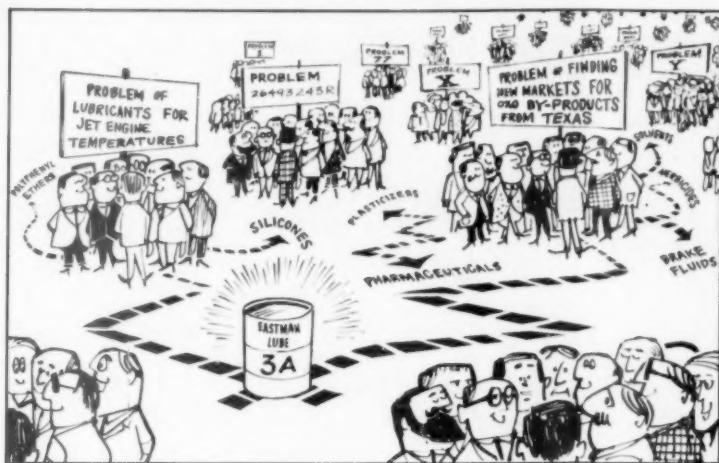
It is by this deep sleep that the hummingbird manages to conserve energy for its life processes. There is energy to spare for courtship, mating, incubating and raising the young. There is energy to spare for the accumulation of a great store of body fat in preparation for the long migration flight.

Interestingly enough, the hummingbird is close kin to two other groups of birds which show some disposition to a hibernation-like sleep. Nestling swifts become torpid when for reasons of bad weather their parents are unable to feed them well. At least one nightjar, Nuttall's poorwill, is known to be a true hibernator in winter.

Science News Letter, October 10, 1959

Kodak reports on:

how modern scientific research is organized... an easy introduction to the chemistry of photography... new life for the old telescope or copying camera



The hot oil project

That, roughly, is how these things develop. The principal constituents of *Eastman Lube 3A* are straight-chain fatty acid esters of trimethylpentanediol, a compound obtained by a certain setting of the valves at our "oxo process" plant in Longview, Texas. No other of the 16 currently accepted 350°F lubricants does so well in the crucial lead corrosion test as *Eastman Lube 3A*, which doesn't even require a special additive to keep it from attack-

ing lead after six months. On the other crucial tests demanded by MIL-L-7808C, *Eastman Lube 3A* makes out OK. Those who need further facts to be impressed can write Eastman Chemical Products, Inc., Kingsport, Tenn. (Subsidiary of Eastman Kodak Company), where friendships formed at a comparatively cool 350°F are expected to warm with the hot pursuit of lubricity to higher temperatures but never in themselves to prove lubricious.

Rave notice

Here is a review of a book entitled "Photo Chemistry in Black-and-White and Color Photography." Since the work was written by the head of the Photographic Chemistry Department of the Kodak Research Laboratories and published by the firm which is paying for this space, the review had darn well better be favorable.

Accurate and well thought out the book certainly is. The very act of acquiring a copy affords pleasure. You visit a camera shop and browse among the gleaming new wonders of Kodak's Automatic Age in Photography. Possibly you buy one. Then you recall that even in an age of button-pushing, principles underlie buttons. You proceed to the Kodak literature corner and look for the title.

It may not be there. In that event you show this advertisement to the clerk, thereby convincing him that the book actually exists and that moreover it would mean an easy \$1.25 sale for him if he would but order it for you. He, in turn, may convince you that it would be simpler to send \$1.35

to Eastman Kodak Company, Sales Service Division, Rochester 4, N. Y., and get it directly by mail. See how it goes.

Acquisition accomplished, comes time to take the measure of the book's content and worth.

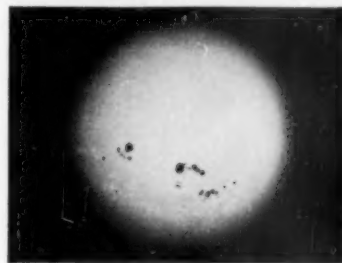
The early chapters could well be for the kiddies, the bright ones that start training early for eminence at the Science Fair. That simple is the author's approach to the photographic process and its history, though he writes for an adult who may lack knowledge of the difference between an element and a compound, yet keep up the payments on a split-level by his skill at something like color printing. Even here provocative tidbits sneak in. Do you know the difference between chemical and physical development? Between the preparation of a printing-out and a developing-out emulsion? What silver iodide does in an emulsion?

The pace quickens. By page 53, where the chapter "Chemistry of Color Development" begins, the reader is already watching dimethyl-p-phenylenediamine and α -naphthol react with

silver bromide to form indophenol blue for the dye image. Soon he is following the reasons for the numerous ingredients of an actual color developer, as we add them one by one.

124 pp., including index. A triumph of exposition, theoretical and practical. You are welcome to quote that.

De orbe...de urbe



This picture of the solar disk with sunspots and bright faculae was taken on *Kodak Autopositive PB Film* at the prime focus of a 6-inch f/15 reflecting telescope at 1/100 second without a filter or any interposed optics. The $\frac{3}{4}$ " negative image can stand a lot more enlargement. Alas, there is no room for that here, or for an explanation of why this particular film was chosen. To read all about it, send for a preprint of "Solar Photography" to Eastman Kodak Company, Special Sensitized Products Division, Rochester 4, N. Y. If you've made a reflecting telescope and sometimes wonder why, you may find a soul-satisfying answer in that article.

The space here must serve more pressing needs having to do with another product called "Autopositive," the new *Kodagraph Autopositive Projection Paper*. This paper you put in an enlarger or copying camera and use for reproducing drawings or documents at any desired magnification or minification. Black photographs black, and white photographs white. The negative-to-positive jazz is avoided, and even the conventional hypo fixing bath is replaced by a jet of plain water. For information on where to buy it and how to use it, write Eastman Kodak Company, Graphic Reproduction Division, Rochester 4, N. Y.

Price quoted is subject to change without notice.

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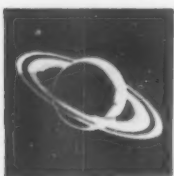
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